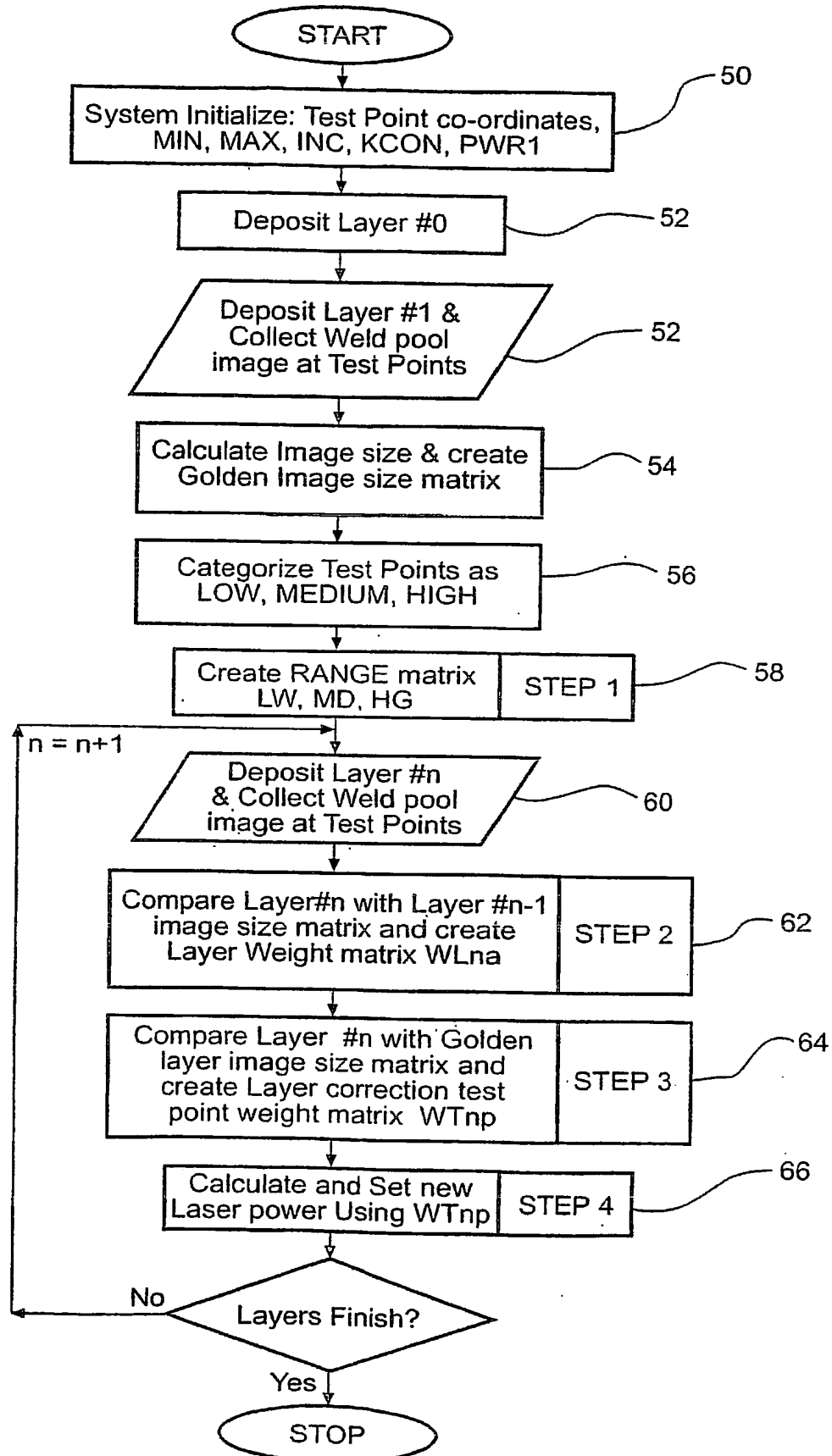


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FIG - 3



LY_n LY is the deposition LAYER
 TP_{np} TP is the Test point co-ordinates
 IM_{np} IM is the Weld pool image size
 LW_a Low Range matrix
 MD_a Medium Range matrix
 HG_a High Range matrix
 WL_{na} Layer weight matrix
 WT_{np} Layer correction test point weight matrix
 PWR_n Laser Power

n: Layer number, where $n = 2$ to m ; 'm' is last layer of deposition;
 p: Test point co-ordinate number, where $p = 1$ to q ; 'q' is the last test point co-ordinate
 a: Element number of the Range and Layer Weight matrix, where $a = 2$ to b ; 'b' is the last element
 H: Biggest Golden layer test point image size
 L: Smallest Golden layer test point image size
 PWR_1 : Golden Layer Laser Power
 LY_1 = Golden layer, LY_0 = Base metal contact deposition layer
 $LW_1 = MD_1 = HG_1 = WL_{n1} = 1$
 MIN, MAX, INC, KCON, LCON, MCON, HCON are Control system constants

STEP1: CREATING RANGE MATRIX (GOLDEN LAYER DATA PROCESSING)

$LW_a = LW_{(a-1)} + (H-L) / LCON$
 $MD_a = MD_{(a-1)} + (H-L) / MCON$
 $HG_a = HG_{(a-1)} + (H-L) / HCON$
 $(H-L) > LCON > MCON > HCON$

STEP2 : CREATING LAYER WEIGHT MATRIX (BY USING PREVIOUS LAYER TEST POINT IMAGE SIZE)

$WL_{na} = WL_{n(a-1)} - INC - ([\sum_{p=1 \text{ to } q} (IM_{np} - IM_{(n-1)p})] / q) \cdot KCON$
 If WL_{na} is less than MIN, set $[WL_{na} = MIN]$

STEP3 : CREATING LAYER CORRECTION
TEST POINT WEIGHT MATRIX (USING GOLDEN LAYER TEST POINT IMAGE SIZE)

$WT_{np} = WL_{na}$

Selection of index 'a' of WL_{na} : If the test point coordinate 'p' in WT_{np} is LOW / MEDIUM / HIGH test point, search for the nearest equivalent of $(IM_{np} - IM_{1p})$ value in LW / MD / HG. Take the corresponding 'a' index number from LW / MD / HG. In cases where the $(IM_{np} - IM_{1p})$ value is greater than all entries in LW / MD / HG, $[WT_{np} = MIN]$ and if $(IM_{np} - IM_{1p})$ value is less than all entries in LW / MD / HG, $[WT_{np} = MAX]$.

STEP4 : CALCULATING NEW LASER POWER FOR THE NEXT LAYER

$PWR_{n+1} = PWR_1 \cdot ([\sum_{p=1 \text{ to } q} (WT_{np})] / q)$

FIG - 4